America, from the Gulf of Mexico to Alaska, there are no abrupt and insuperable barriers, either topographic or climatic, to the continuous distribution of many forms of life; the diversity of conditions, due primarily to climate, however, is so great that few, if any, species of mammals range throughout this whole area, or of birds that have a breeding range of this great extent. Each climatic zone has its peculiar associations of life, made up by the overlapping of the ranges of different sets of species, whose final boundaries are formed for each by a particular combination of climatic conditions. Aside from the temperature zones, just considered, other climatic factors, as especially that of rainfall, become active in passing from the eastern border of the United States westward to the Rocky Mountains and the Pacific coast. There thus arise a large number of faunal areas aside from those dependent on zones of temperature. The transition between these also is not sufficiently abrupt, except where locally complicated with topographic barriers, to prevent the continuous distribution of many species of birds and mammals. But the transition at certain points between contiguous forms is much more rapid over certain comparatively narrow belts than elsewhere. If we take some central point in the eastern United States, as for instance Columbus, Ohio, we may go east, west, north or south for several hundred miles in an area where the amount of local or climatic differentiation is so small as to be practically indistinguishable; in other words, we are in the central portion of a large area where the conditions of life are comparatively uniform, and are reflected in the practically constant characters—color, size, etc.—of its animals. If, however, we pass westward to about the ninety-eighth meridian, on the same parallel, we meet with wholly different conditions; we are then in a transition belt, where the characters of the animals are unstable; we have left the eastern phases of many of the mammals that range continuously westward, but have not yet reached the Great Plains phases that come in and for a long distance take their place as stable western forms representing the equally stable eastern forms we have left behind. We are in a comparatively narrow belt of intermediates—in some respects the *bête noir* of the systematist, in others constituting an invaluable key to otherwise intricate problems in evolution—which in turn reflect the action of intermediate conditions of environment between two well-marked areas. There is no barrier, topographic, climatic, or even bionomic, under any reasonable use of these terms; the transition belt is narrow, seldom more than thirty to fifty or a hundred miles in width; there is every opportunity for interbreeding, and no barrier other than the sedentary disposition of individual animals. If this fulfills Professor Ortmann's definition of 'no continuity of bionomic conditions,' and meets President Jordan's definition of 'isolation,' we at least understand each other.

J. A. Allen.

American Museum of Natural History,
New York City,
January 21, 1906.

SPECIAL ARTICLES.

On the Breaking-up of the Old Genus Culex.

Within the past two years attempts have been made to break up the old genus *Culex* into smaller genera based chiefly or wholly upon the structure of the claspers of the male. That too great stress has been laid upon this character in many cases is the opinion of more than one systematic worker in the Diptera. Thus such very closely related species as *sylvestris* and *cantator* are separated into distinct genera, while, on the other hand, such very diverse forms as *sollicitans, squamiger, bigotii, annulatus, janitor* and *discolor* are placed in one and the same genus. In this as in other cases, any attempt at a classification founded upon a single character is certain to produce unsatisfactory results; only by taking into consideration the habits and entire life cycle of the various forms can anything approximating a natural grouping be formulated.

The writer has recently been able to make a long-contemplated study of the species of this country placed by Theobald in the genus *Culex* in the first two volumes of his mono-

graph, with a view to the bringing about of a more natural grouping of these forms, for use in a circular soon to be issued by Dr. L. O. Howard; as the character of that publication precludes the giving of an exposition of the subject, it has been thought best to give this in the pages of SCIENCE.

I first made a critical study of the members of this genus in the year 1895,[1] and was impressed with the importance of the structure of the tarsal claws of the female—whether toothed, or simple—and later began all of my published synoptic tables of the species with this character. The present study has but confirmed the correctness of that first impression—that all of the species with simple claws in the female are more nearly related to each other than they are to any species in the series having the claws toothed, and *vice versa*. Several months ago Miss E. G. Mitchell expressed the opinion that those species which lay their eggs in masses form a natural group by themselves, and stated that their larvæ possess important structural characters not found among those belonging to the single-egg group. That the difference in the manner of egg-laying is an important one admits of no argument; even the enveloping membrane is structurally different in the two kinds of eggs. Applying the egg-laying habit, so far as this is at present known, to the members of the two tarsal-claw groups, it was ascertained that all those with toothed claws deposit their eggs singly, while those with simple claws lay their eggs in masses with the exception of a single genus (*Grabhamia*). This was sufficient agreement to indicate an evident correlation existing between the egg-laying habits and the character of the tarsal claws. Next, by taking jointly the more prominent characters from both adults and larvæ a rational and natural grouping resulted, as may be seen by reference to the accompanying table:

A. Tarsal claws of the female simple, scales of the mesonotum and the outstanding ones on the wing veins narrow and almost linear.

B. Eggs laid in masses. Larva having more than one pair of tufts or of single hairs on the breathing tube, or else with ten or more bristles in continuation of the two rows of spines. Tarsi of the adult white at each end of some of the joints, or else wholly black, in which latter case the abdomen is black scaled, sometimes with basal light colored bands on the segments.

C. Hind cross-vein of the wings more than its own length distant from the small, palpi of the male exceeding the proboscis by more than the length of the last joint, densely long-haired. Larva with more than one pair of tufts or of single hairs on the breathing tube, the two rows of spines never continued by bristles, antennal tuft situated in a distinct notch (*pipiens*, etc.).

Culex Linné.

CC. Hind cross-vein less than its length from the small, palpi of the male scarcely exceeding the proboscis, sparsely short-haired. Larva with only one pair of tufts on the breathing tube, situated close to its base, the two rows of spines continued by ten or more bristles, antennal tuft never in a notch.

D. Scales of the wings uniformly distributed (*absobrinus*, etc.).

Culiseta Felt.

DD. Scales much more dense on some portions of the veins than on other portions (*annulatus*, etc.).

Theobaldia Nev. Lem.

BB. Eggs laid singly. Larva having only one pair of tufts on the breathing tube, the two rows of spines composed of from four to six spines each, the rows never continued by bristles, spines on either side of the eighth segment of the abdomen very large, from four to six in number, arranged in a single row. Tarsi of the adult white at the bases only of some of the joints, or else wholly black, in which case the abdomen is black scaled and with the front corners of the segments white scaled (*jamaicensis*, etc.).

Grabhamia Theob.

AA. Tarsal claws of the female toothed in at least the front and middle feet. Eggs laid singly. Larva with only one pair of tufts on the breathing tube (except in *cinereoborealis*), the two rows of spines composed of ten or more rather small ones in each row, the latter not continued by bristles.

E. Scales of the mesonotum narrow, almost linear.

F. Outstanding scales of the wing-veins nar-

[1] See the *Canadian Entomologist* for 1896, page 43.

row, only slightly tapering toward their bases (*confirmatus*, etc.).

Ochlerotatus Arrib.

FF. Outstanding scales chiefly very broad, strongly tapering toward their bases, several of them emarginate at their apices (type, *squamiger*). *Lepidoplatys* n. gen.

EE. Scales of the mesonotum chiefly rather broad, obovate, outstanding scales of the wing veins narrow (type, *cyanescens*).

Lepidosia n. gen.

For want of knowledge of the egg-laying habits, the genus *Culicella* is omitted from the above table; also the genera *Melanoconion* and *Pneumaculex*, both of which have rather broad scales on the wing veins. The synonymy of the other proposed names, so far as these can be made out at the present writing, is as follows:

Culex Linné: *Heteronycha* Arrib., *Neoculex* Dyar.

Grabhamia Theob.: *Feltidia* Dyar.

Ochlerotatus Arrib.: *Culicelsa, Culicada, Ecculex* and *Protoculex* Felt; *Pseudoculex* Dyar and *Grabhamia* Dyar (not of Theobald).

D. W. Coquillett.
U. S. National Museum,
January 19, 1906.

IMPORTATIONS OF THE PRICKLY PEAR FROM MEXICO.

The United States Department of Agriculture, through the Office of Grass and Forage Plant Investigations, has within the past three months made some large importations of species of economic cacti from the plateau region of Mexico. There is probably no region in the world where these plants are of so much importance as food for man and beast as they are in the great highland region of this republic. While some of the recent accounts of these plants which have appeared in the popular journals are spectacular and much overdrawn, there is still a great deal of well-founded popular and scientific interest in the prickly pears in this country. The importance of the prickly pear in the region above mentioned is apparent to all who have traveled in Mexico and observed Mexican habits and customs at all closely during any season of the year, for there is scarcely a day throughout the year that the fruits, to say nothing of portions of the plants themselves, are not offered for sale on some of the markets in the cities of the republic.

The following brief list of imported varieties will serve as an illustration of the wealth and variety of material which the Mexican people have at their command: Nopal aguamielillo, nopal amarillo, nopal amarillo-blanco, nopal amarillo-liso, nopal arton, nopal blanco, nopal blanco-liso, nopal charol, nopal caidillo, nopal camueso, nopal cardon, nopal cardon-blanco, nopal castillo-blanco, nopal cascaron, nopal cenizo, nopal chamacuero, nopal chaveño, nopal cochinero, nopal cogonoxtle (cardencha), nopal colorado, nopal cristalino, nopal cuijo, nopal duraznillo, nopal duraznillo blanco, nopal duraznillo colorado, nopal fafayuco, nopal huevo de perro, nopal encarnadillo, nopal jarillo, nopal jocoquilla, nopal joconoxtle, nopal joconoxtle-chato, nopal joconoxtle-cuaresmaro, nopal leonero, nopal liso, nopal loco, nopal mameyo, nopal mansomorado, nopal naranjado, nopal negrito, nopal opalillo (apalillo), nopal pachon, nopal palamito, nopal paloalteño, nopal San Juanero, nopal sarco, nopal tapon, nopal tapon liso, nopal teca, nopal temperanillo, nopal vinatero, nopalito de jardin. About as many more unnamed economic forms in addition to the above have been imported.

Some of the above popular names refer to the same plant, being different appellations for the same thing from different localities, and others are varietal names only, but it is believed that the majority of them represent good botanical species.

David Griffiths.
U. S. Department of Agriculture.

CURRENT NOTES ON METEOROLOGY.

MOISTURE FOR HEATED HOUSES IN WINTER.

The dryness of the air in our furnace or steam-heated buildings in winter has often been referred to, and has also been experimentally investigated. Recently Mr. G. A. Loveland, section director of the Nebraska Climate and Crop Service, has made some cal-